WE CLAIM:

1. A system for prescribing point-to-point channels among nodes, comprising means for
     inputting the total number of nodes;
     inputting the total number of nodes;
     determining an assignment of fewest channels
          that guarantees every pair of fault-free nodes is connected by some path in the same quorum;
     and outputting the channel assignments.

2. The system as recited in claim 1, with means for minimizing the quorum radius or diameter.

3. The system as recited in claim 1, with means for inputting channel cost; and determining a minimum cost channel assignment.

4. The system as recited in claim 1, with means for inputting latencies for nodes and channels; and determining a minimum cost channel assignment that minimizes the maximum quorum latency.

5. The system as recited in claim 1, with means for inputting capacities for nodes and channels; and determining a minimum cost channel assignment which maximizes quorum throughput.

6. The system as recited in claim 1, with means for inputting node values; and determining a channel assignment with maximum quorum value, gross or net.

7. The system as recited in claim 1 with faults distributed probabilistically or deterministically.

8. The system as recited in claim 1, such that the guarantee of quorum formation is replaced by probabilistic assurance.

9. The system as recited in claim 1, such that faults may occur in channels, nodes, or both channels and nodes.

10. The system as recited in claim 1, such that the channel assignment is required to be regular, or nearly so.

11. The system as recited in claim 1, such that the quorums may contain an arbitrarily specified number or proportion of faults.

12. The system as recited in claim 1, such that the channel assignments correspond to test assignments for mutual test and diagnosis (MTAD).

13. The system as recited in claim 1, such that edges in the underlying graph model are generalized to directed multi-edges or hyper-edges.

14. A computer implementation of the system recited in claim 1.

15. The computer implementation as recited in claim 14, with the objective of designing or operating multicomputers, networks, bus structures, or circuits.

16. A method for prescribing point-to-point channels among nodes, comprising
     inputting the total number of nodes;
     inputting the total number of nodes;
     determining an assignment of fewest channels
          that guarantees every pair of fault-free nodes is connected by some path in the same quorum;
     and outputting the channel assignments.

17. The method as recited in claim 16, additionally minimizing the quorum radius or diameter.

18. The method as recited in claim 16, additionally inputting channel cost; and determining a minimum cost channel assignment.

19. The method as recited in claim 16, additionally inputting latencies for nodes and channels; and determining a minimum cost channel assignment that minimizes the maximum quorum latency.

20. The method as recited in claim 16, additionally inputting capacities for nodes and channels; and determining a minimum cost channel assignment which maximizes quorum throughput.

21. The method as recited in claim 16, additionally inputting node values; and determining a channel assignment with maximum quorum value, gross or net.

22. The method as recited in claim 16, with faults distributed probabilistically or deterministically.

23. The method as recited in claim 16, such that the guarantee of quorum formation is replaced by probabilistic assurance.

24. The method as recited in claim 16, such that faults may occur in channels, nodes, or both channels and nodes.

25. The method as recited in claim 16, such that the channel assignment is required to be regular, or nearly so.

26. The method as recited in claim 16, such that the quorums may contain an arbitrarily specified number or proportion of faults.

27. The method as recited in claim 16, such that the channel assignments correspond to test assignments for mutual test and diagnosis (MTAD).

28. The method as recited in claim 16, such that edges in the underlying graph model are generalized to directed multi-edges or hyper-edges.